Course Description and Aims

This course has the aim to present the fundamentals and industrial applications of wetting phenomena to engineers and researchers in chemical, mechanical, pharmaceutical, environmental and food engineering.
The fundamentals of interfacial physics and wetting phenomena are addressed in the first day of the course, together with the methods of theoretical and numerical description of wetting.
The second day is devoted to techniques for preparation of surfaces and characterization of interfaces. These are experimental methods determining contact angle, interfacial tension, etc.
On the third day the complex wetting phenomena will be presented, involving complex surfaces (soft, textured, porous, coated…) and complex liquids (surfactant solutions). A special focus of the day lies on the methods of controlling the wetting phenomena.
The last day is devoted to typical industrial applications relying on the wetting phenomena such as functional printing and coating, prevention of ice accretion, etc.
The program foresees intensive discussions between the participants and the lecturers and also among the participants. The aim is to address ongoing development and application problems suggested by the participants. Industrial exhibitors of wetting and spreading diagnostics will be available on the second day for demonstrations and discussions.

Who should attend?

The course is designed for engineers and researchers encountering the wetting issues in chemical, mechanical, pharmaceutical, environmental and food industry. The course embraces the fundamentals of wetting, the theoretical, numerical and experimental aspects of statics and dynamics of wetting as well as industrial applications.

Venue

Technische Universität Darmstadt
Center of Smart Interfaces (Lichtwiese Campus)
Alarich-Weiss-Straße 10
64287 Darmstadt, Germany
www.csi.tu-darmstadt.de

Participants should make their own accommodation arrangements. For a recommendation of hotels or further information, please refer to the course website or contact Ms. Monika Medina (medina@csi.tu-darmstadt).

Fees and Registration

Registration for this four-day short course can be made under

www.csi.tu-darmstadt.de/kasi

The fee for participation is 1200 EUR and is VAT free according to §4 Nr. 22a USTG. A reduction of 50% applies to all further participants from the same institute of higher education. A charge of 50 EUR applied to cancelations up to the start of the course. The fee includes all documentation of the lectures, coffee breaks, lunches and a course dinner on the third day. Participation is limited to 40 people.

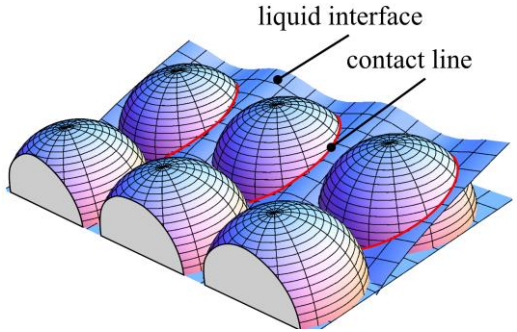
A Short Course on
Industrial Wetting

March 14- 17, 2016
Technische Universität Darmstadt
Darmstadt, Germany

TECHNISCHE UNIVERSITÄT DARMSTADT

complex wetting
Marie Curie Initial Training Network (ITN)

Center of Smart Interfaces



Offered by the Center of Smart Interfaces
www.csi.tu-darmstadt.de

Lecturers

Dr. Elmar Bonaccurso
Project Leader for Aerodynamic Efficient Surfaces at Airbus Defence and Space GmbH

Prof. Joel De Coninck
heads the Laboratory of Surface and Interfacial Physics, University of Mons

Prof. Dr.-Ing. Edgar Dörsam
heads the Institute of Printing Science and Technology at the TU Darmstadt

Apl. Prof. Dr. Tatiana Gambaryan-Roisman
heads a research group at the Institute of Technical Thermodynamics at the TU Darmstadt

Dr.-Ing. Nicklas Linder
TWT Science & Innovation GmbH

Prof. Shlomo Magdassi
Hebrew University of Jerusalem, Center for Nanoscience and Nanotechnology

Dr. habil. Reinhard Miller
heads a research group at the Max Planck Institute of Colloids and Interfaces

Prof. Ramon G. Rubio
Universidad Complutense de Madrid, Department of Chemical Physics

Priv.-Doz. Dr. Ilia V Roisman
heads a research group at the Institute For Fluid Mechanics and Aerodynamics at the TU Darmstadt

Prof. Dr. Robert Stark
heads the Institute Physics of Surfaces at the TU Darmstadt

Prof. Dr.-Ing. Peter Stephan
heads the Institute of Technical Thermodynamics at the TU Darmstadt

Prof. Victor Starov
Loughborough University, Department of Chemical Engineering

Prof. Dr.-Ing. Cameron Tropea
heads the Institute for Fluid Mechanics and Aerodynamics at the TU Darmstadt

Dr. Joachim Venzmer
Head of Research Interfacial Technology, Evonik Nutrition & Care GmbH

Mo, 14.3.: Fundamentals

8:30	Registration, Distribution of Lecture Notes
9:00	Welcome, Introductions, Overview of the Course (*Gambaryan-Roisman*)
9:30	Capillarity and surface tension *(Gambaryan-Roisman)*
10:30	Coffee
11:00	Hydrodynamic of interfaces *(Gambaryan-Roisman)*
11:45	Surface forces and wetting phenomena *(Starov)*
12:30	Lunch
13:30	Static wetting *(Roisman)*
14:15	Dynamic wetting: hydrodynamic and molecular-dynamic approaches (*Roisman)*
15:00	Coffee
15:30	Wetting with phase change (*Stephan*)
16:15	Discussion of participant cases
17:00	Close of first day with beer and pretzels

Tue, 15.3.: Preparation and characterization

9:00	Preparation and characterization of surfaces (*Stark)*
10:30	Coffee
11:00	Characterization of surface and interfacial tension, contact angles *(Miller)*
12:30	Lunch
13:30	Characterization of interfacial rheology in industry-relevant systems *(Rubio)*
15:00	Coffee
15:30	Optical measurement techniques of wetting processes (*Tropea*)
16:45	Exhibition of wetting and surface diagnostic equipment (also during lunch and the second coffee break)

Wed, 16.3.: Complex surfaces and liquids

9:00	Dynamic wetting of soft, liquid and soluble surfaces (*Gambaryan-Roisman*)
10:30	Coffee
11:00	Wetting of membranes and porous media *(Starov)*
12:00	Lunch
13:00	Dynamic wetting of textured surfaces (*Roisman*)
14:00	Wetting agents and superspreading (*Venzmer)*
15:30	Coffee
16:00	Superhydrophobic surfaces: applications, principles, manufacturing and stability (*De Coninck*)
17:00	Close of third day
19:00	Short course dinner

Thu, 17.3.: Industrial applications

9:00	Modern coating and printing technologies (*Dörsam*)
9:45	Complex liquids for 3D and functional printing (*Magdassi)*
10:30	Coffee
11:00	Complex liquids for 3D and functional printing *(Magdassi)*
11:45	Icephobic coatings for aeronautical applications *(Bonaccurso)*
12:30	Lunch
13:30	Icephobic coatings for aeronautical applications *(Bonaccurso)*
14:15	Dynamic wetting: numerical approach in industrial applications *(Linder)*
15:00	Close of short course